



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No. H-204145

(Continuation of USSN 09/469,800 filed December 22, 1999)

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COGENERATION SYSTEM FOR A  
FUEL CELL

Examiner R. Alejandro

PRELIMINARY AMENDMENT

Commissioner for Patents  
Washington DC 20231

Prior to examination of the above-identified application, please enter the following amendment:

IN THE CLAIMS:

Cancel claims 1-20.

Add claims 21 and 22 as follows:

21. A process comprising:

heating a fuel cell stack during cold startup conditions including:

pumping a cooling fluid including a liquid to an elevated pressure,

transferring thermal energy from the cooling fluid to the fuel cell stack, and

repeating the above steps for heating a fuel cell stack during cold startup

conditions until the temperature of the fuel cell stack has reached a temperature for operating the fuel cell under post-startup conditions and wherein the operation of the fuel cell stack produces waste heat, and

cooling a fuel cell stack during post-startup operations and using waste heat generated

by the fuel cell stack to produce shaft work including:

pumping the cooling fluid to the fuel cell stack,

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transferring thermal energy from the fuel cell stack to the cooling fluid to cool the fuel cell stack and to heat the cooling fluid,

supplying additional heat to the cooling fluid to change the liquid to a gas,

15 expanding the heated cooling fluid through an expander to produce shaft work,

driving an air compressor using the shaft work to compress air and deliver the compressed air to the fuel cell,

directing the cooling fluid through a condenser having condenser fans that are turned on to remove heat from the cooling fluid and to change the gas to the liquid, and

20 repeating the above steps for cooling a fuel cell stack during post-startup conditions and using waste heat generated by the fuel cell stack to produce shaft work.

22. The process as set forth in claim 21 wherein the step of heating a fuel cell stack during cold startup conditions further comprises:

after heating the fuel cell stack by transferring thermal energy from the cooling fluid to the fuel cell stack, heating the cooling fluid with a second heat source to change the liquid to a gas, expanding the heated cooling fluid in an expander to produce shaft work, driving an air compressor with the shaft work to compress air and delivering the compressed air to the fuel cell stack, directing the cooling fluid through a condenser having condenser fans and wherein the condenser fans are turned off.

Respectfully submitted,



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